

# 74V1G08

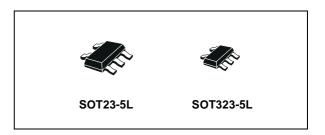
# SINGLE 2-INPUT AND GATE

- HIGH SPEED: t<sub>PD</sub> = 3.8ns (TYP.) at V<sub>CC</sub> = 5V
- LOW POWER DISSIPATION:  $I_{CC} = 1\mu A(MAX.)$  at  $T_A=25^{\circ}C$
- HIGH NOISE IMMUNITY: V<sub>NIH</sub> = V<sub>NIL</sub> = 28% V<sub>CC</sub> (MIN.)
- POWER DOWN PROTECTION ON INPUTS
- SYMMETRICAL OUTPUT IMPEDANCE: |I<sub>OH</sub>| = I<sub>OL</sub> = 8mA (MIN) at V<sub>CC</sub> = 4.5V
- BALANCED PROPAGATION DELAYS: t<sub>PLH</sub> ≅ t<sub>PHL</sub>
- OPERATING VOLTAGE RANGE: V<sub>CC</sub>(OPR) = 2V to 5.5V
- IMPROVED LATCH-UP IMMUNITY

#### **DESCRIPTION**

The 74V1G08 is an advanced high-speed CMOS SINGLE 2-INPUT AND GATE fabricated with sub-micron silicon gate and double-layer metal wiring C<sup>2</sup>MOS technology.

The internal circuit is composed of 2 stages including buffer output, which provide high noise immunity and stable output.

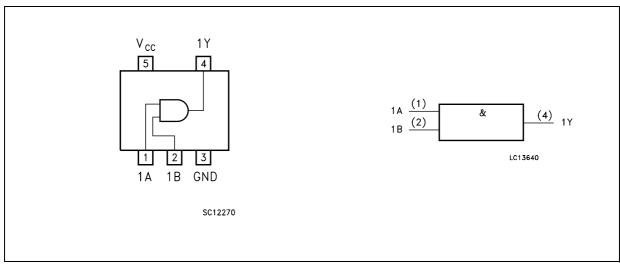


#### **ORDER CODES**

PACKAGE	T & R
SOT23-5L	74V1G08STR
SOT323-5L	74V1G08CTR

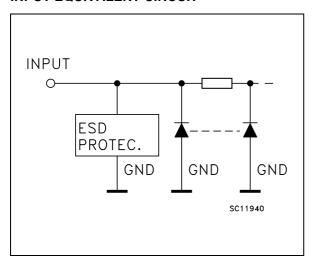
Power down protection is provided on all inputs and 0 to 7V can be accepted on inputs with no regard to the supply voltage. This device can be used to interface 5V to 3V.

#### PIN CONNECTION AND IEC LOGIC SYMBOLS



July 2001 1/9

### **INPUT EQUIVALENT CIRCUIT**



### **PIN DESCRIPTION**

PIN No	SYMBOL	NAME AND FUNCTION
1	1A	Data Input
2	1B	Data Input
4	1Y	Data Output
3	GND	Ground (0V)
5	V <sub>CC</sub>	Positive Supply Voltage

#### **TRUTH TABLE**

Α	В	Y
L	L	L
L	Н	L
Н	L	L
Н	Н	Н

#### **ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value	Unit
V <sub>CC</sub>	Supply Voltage	-0.5 to +7.0	V
V <sub>I</sub>	DC Input Voltage	-0.5 to +7.0	V
Vo	DC Output Voltage	-0.5 to V <sub>CC</sub> + 0.5	V
I <sub>IK</sub>	DC Input Diode Current	- 20	mA
I <sub>OK</sub>	DC Output Diode Current	± 20	mA
Io	DC Output Current	± 25	mA
I <sub>CC</sub> or I <sub>GND</sub>	DC V <sub>CC</sub> or Ground Current	± 50	mA
T <sub>stg</sub>	Storage Temperature	-65 to +150	°C
T <sub>L</sub>	Lead Temperature (10 sec)	260	°C

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied.

### **RECOMMENDED OPERATING CONDITIONS**

Symbol	Parameter	Value	Unit
V <sub>CC</sub>	Supply Voltage	2 to 5.5	V
V <sub>I</sub>	Input Voltage	0 to 5.5	V
V <sub>O</sub>	Output Voltage	0 to V <sub>CC</sub>	V
T <sub>op</sub>	Operating Temperature	-55 to 125	°C
dt/dv	Input Rise and Fall Time (note 1) ( $V_{CC}$ = 3.3 $\pm$ 0.3V) ( $V_{CC}$ = 5.0 $\pm$ 0.5V)	0 to 100 0 to 20	ns/V ns/V

1) V<sub>IN</sub> from 30% to 70% of V<sub>CC</sub>

### **DC SPECIFICATIONS**

		Т	est Condition				Value				
Symbol	Parameter	v <sub>cc</sub>		T <sub>A</sub> = 25°C -40			-40 to	-40 to 85°C   -55 to		125°C	Unit
		(V)		Min.	Тур.	Max.	Min.	Max.	Min.	Max.	
V <sub>IH</sub>	High Level Input	2.0		1.5			1.5		1.5		
	Voltage	3.0 to 5.5		0.7V <sub>CC</sub>			0.7V <sub>CC</sub>		0.7V <sub>CC</sub>		V
$V_{IL}$	Low Level Input	2.0				0.5		0.5		0.5	
	Voltage	3.0 to 5.5				0.3V <sub>CC</sub>		0.3V <sub>CC</sub>		0.3V <sub>CC</sub>	V
V <sub>OH</sub>	High Level Output	2.0	I <sub>O</sub> =-50 μA	1.9	2.0		1.9		1.9		
	Voltage	3.0	I <sub>O</sub> =-50 μA	2.9	3.0		2.9		2.9		
		4.5	I <sub>O</sub> =-50 μA	4.4	4.5		4.4		4.4		V
		3.0	I <sub>O</sub> =-4 mA	2.58			2.48		2.4		
		4.5	I <sub>O</sub> =-8 mA	3.94			3.8		3.7		
V <sub>OL</sub>	Low Level Output	2.0	I <sub>O</sub> =50 μA		0.0	0.1		0.1		0.1	
	Voltage	3.0	I <sub>O</sub> =50 μA		0.0	0.1		0.1		0.1	
		4.5	I <sub>O</sub> =50 μA		0.0	0.1		0.1		0.1	V
		3.0	I <sub>O</sub> =4 mA			0.36		0.44		0.55	
		4.5	I <sub>O</sub> =8 mA			0.36		0.44		0.55	
I <sub>I</sub>	Input Leakage Current	0 to 5.5	V <sub>I</sub> = 5.5V or GND			± 0.1		± 1		± 1	μΑ
I <sub>CC</sub>	Quiescent Supply Current	5.5	$V_I = V_{CC}$ or GND			1		10		20	μΑ

# AC ELECTRICAL CHARACTERISTICS (Input $t_r = t_f = 3ns$ )

		Test Condition		Value								
Symbol	Parameter	v <sub>cc</sub>	CL		Т	A = 25°	С	-40 to	85°C	-55 to	125°C	Unit
		V <sub>CC</sub>	(pF)		Min.	Тур.	Max.	Min.	Max.	Min.	Max.	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay	3.3 <sup>(*)</sup>	15			5.2	7.5	1.0	9.0	1.0	10.0	
	Time	3.3 <sup>(*)</sup>	50			5.8	8.5	1.0	10.0	1.0	11.0	nc
		5.0 <sup>(**)</sup>	15			3.8	5.9	1.0	7.0	1.0	8.0	ns
		5.0 <sup>(**)</sup>	50			4.6	7.0	1.0	8.0	1.0	9.0	

<sup>(\*)</sup> Voltage range is  $3.3\text{V} \pm 0.3\text{V}$  (\*\*) Voltage range is  $5.0\text{V} \pm 0.5\text{V}$ 

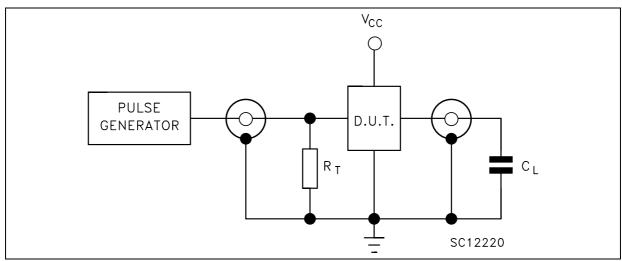
## **CAPACITIVE CHARACTERISTICS**

		Test Condition		Value						
Symbol	Parameter		Т	<sub>A</sub> = 25°	С	-40 to	85°C	-55 to	125°C	Unit
			Min.	Тур.	Max.	Min.	Max.	Min.	Max.	
C <sub>IN</sub>	Input Capacitance			4	10		10		10	pF
C <sub>PD</sub>	Power Dissipation Capacitance (note 1)			10						pF

<sup>1)</sup>  $C_{PD}$  is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load. (Refer to Test Circuit). Average operating current can be obtained by the following equation.  $I_{CC(opr)} = C_{PD} \times V_{CC} \times f_{IN} + I_{CC}$ 

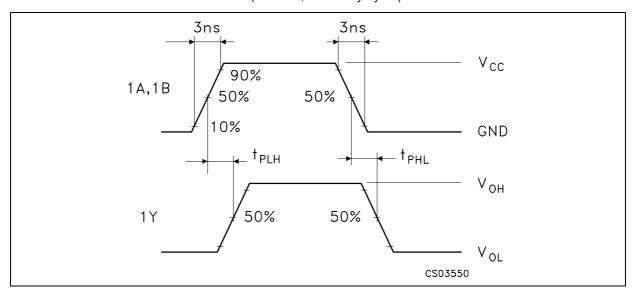


### **TEST CIRCUIT**



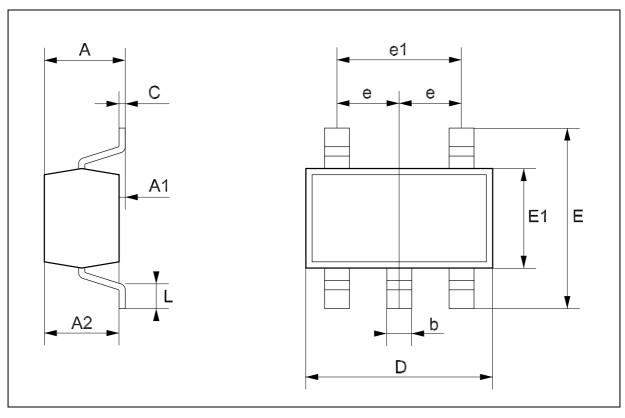
 $C_L$  = 15/50pF or equivalent (includes jig and probe capacitance)  $R_T$  =  $Z_{OUT}$  of pulse generator (typically 50 $\Omega$ )

### WAVEFORM: PROPAGATION DELAY (f=1MHz; 50% duty cycle)



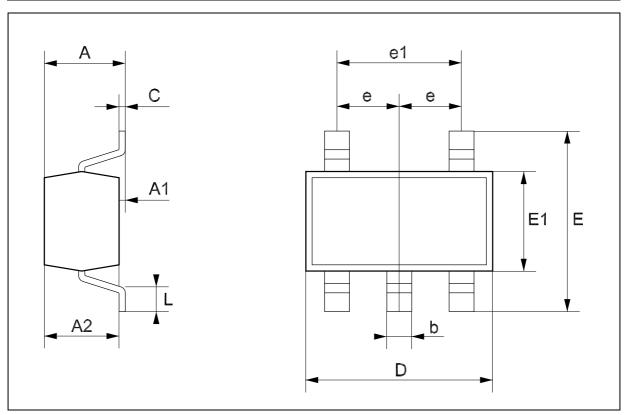
# **SOT23-5L MECHANICAL DATA**

DIM		mm.			mils	mils		
DIM.	MIN.	TYP	MAX.	MIN.	TYP.	MAX.		
А	0.90		1.45	35.4		57.1		
A1	0.00		0.15	0.0		5.9		
A2	0.90		1.30	35.4		51.2		
b	0.35		0.50	13.7		19.7		
С	0.09		0.20	3.5		7.8		
D	2.80		3.00	110.2		118.1		
E	2.60		3.00	102.3		118.1		
E1	1.50		1.75	59.0		68.8		
е		0.95			37.4			
e1		1.9			74.8			
L	0.35		0.55	13.7		21.6		



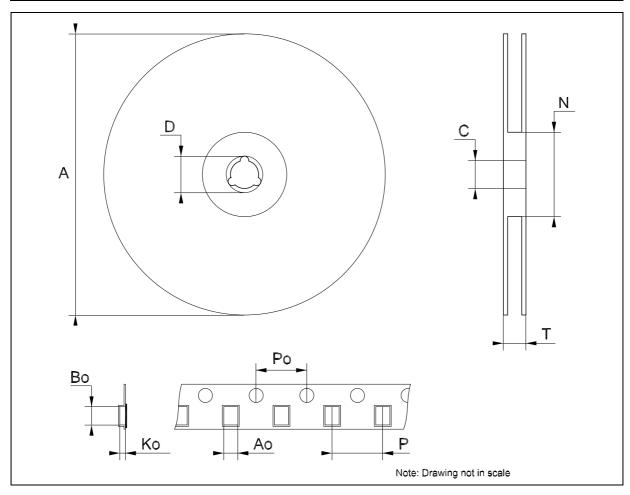
# **SOT323-5L MECHANICAL DATA**

DIM		mm.			mils		
DIM.	MIN.	ТҮР	MAX.	MIN.	TYP.	MAX.	
А	0.80		1.10	31.5		43.3	
A1	0.00		0.10	0.0		3.9	
A2	0.80		1.00	31.5		39.4	
b	0.15		0.30	5.9		11.8	
С	0.10		0.18	3.9		7.1	
D	1.80		2.20	70.9		86.6	
E	1.80		2.40	70.9		94.5	
E1	1.15		1.35	45.3		53.1	
е		0.65			25.6		
e1		1.3			51.2		
L	0.10		0.30	3.9		11.8	



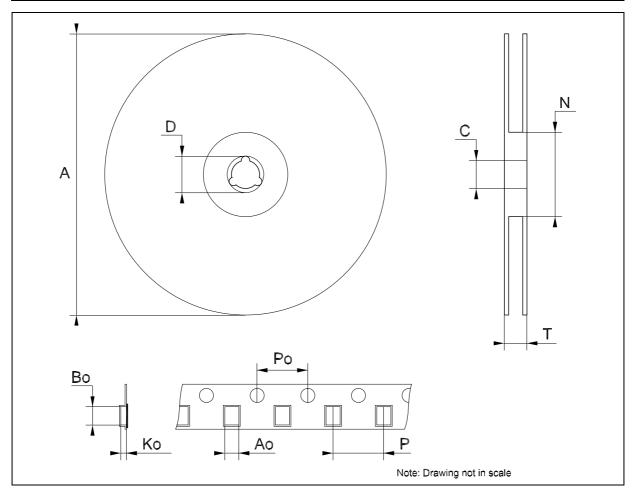
Tape &	Reel	SOT23-xL	<b>MECHANICAL</b>	<b>DATA</b>
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DIM		mm.			inch		
DIM.	MIN.	TYP	MAX.	MIN.	TYP.	MAX.	
Α			180			7.086	
С	12.8	13.0	13.2	0.504	0.512	0.519	
D	20.2			0.795			
N	60			2.362			
Т			14.4			0.567	
Ao	3.13	3.23	3.33	0.123	0.127	0.131	
Во	3.07	3.17	3.27	0.120	0.124	0.128	
Ko	1.27	1.37	1.47	0.050	0.054	0.0.58	
Po	3.9	4.0	4.1	0.153	0.157	0.161	
Р	3.9	4.0	4.1	0.153	0.157	0.161	



Tape & Reel SOT323-xL MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
Α	175	180	185	6.889	7.086	7.283
С	12.8	13	13.2	0.504	0.512	0.519
D	20.2			0.795		
N	59.5	60	60.5		2.362	
Т			14.4			0.567
Ao		2.25			0.088	
Во		2.7			0.106	
Ko		1.2			0.047	
Po	3.98	4	4.2	0.156	0.157	0.165
Р	3.98	4	4.2	0.156	0.157	0.165



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